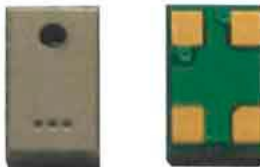


Microphone Test System



Mobile Phone Microphones



MEMS Microphones

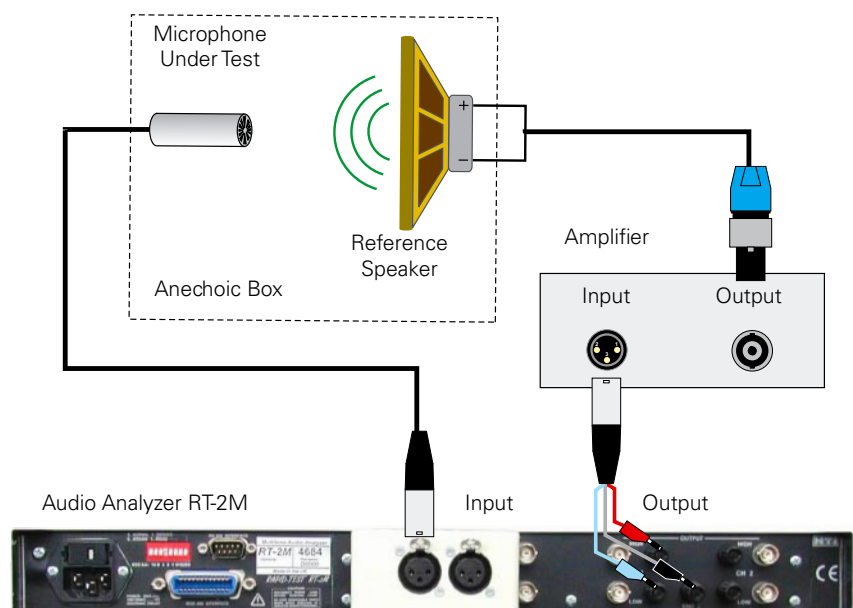


Vocal Microphones

The NTi Audio microphone test system is a comprehensive test solution with short test cycle times. The turnkey system is based on the high-speed audio analyzer RT-2M and the dedicated production test software "RT-Microphone". It provides a comprehensive set of measurements for the total quality control of microphone components or final assembled products, such as mobile phones, vocal microphones or headsets.

Key-Parameters:

- Accurate and repeatable measurements
- Turnkey Solution with flexible user interface
- Short test cycle time, typically < 2 seconds
- Dedicated for R&D and automated production lines
- Scalable test architecture with dual channel measurements and optional switchers for sequential testing of one or more microphones
- Built in phantom power supply



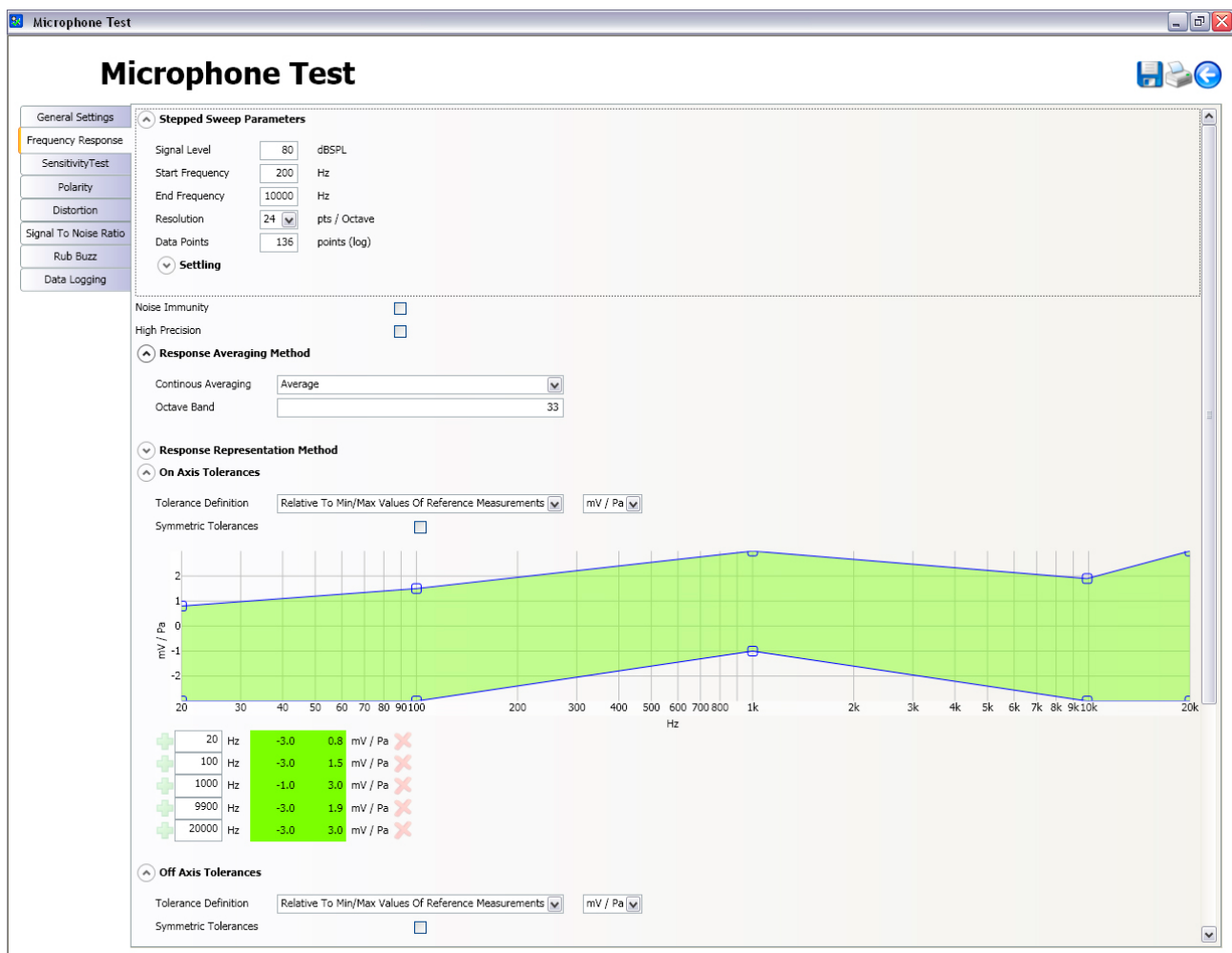
Test Configuration in the Production Line

Flexible Parameter and Tolerance Setting

Microphones naturally bear an error rate in production. Sorting out faulty devices in an early production stage is important, thus this increases the overall yield, reduces waste material and optimizes the quality of the manufactured goods. Important for a modern, state-of-the-art microphone test system are reproducibility, automation, speed and simplicity. The RT-2M audio analyzer forms the microphone test system comprising exactly these features.

Measurement Functions:

- Frequency response in-axis, off-axis
- Sensitivity
- Distortion
- Signal-to-noise ratio S/N
- Detection of audible imperfections
- Directivity, polar plot and polarity

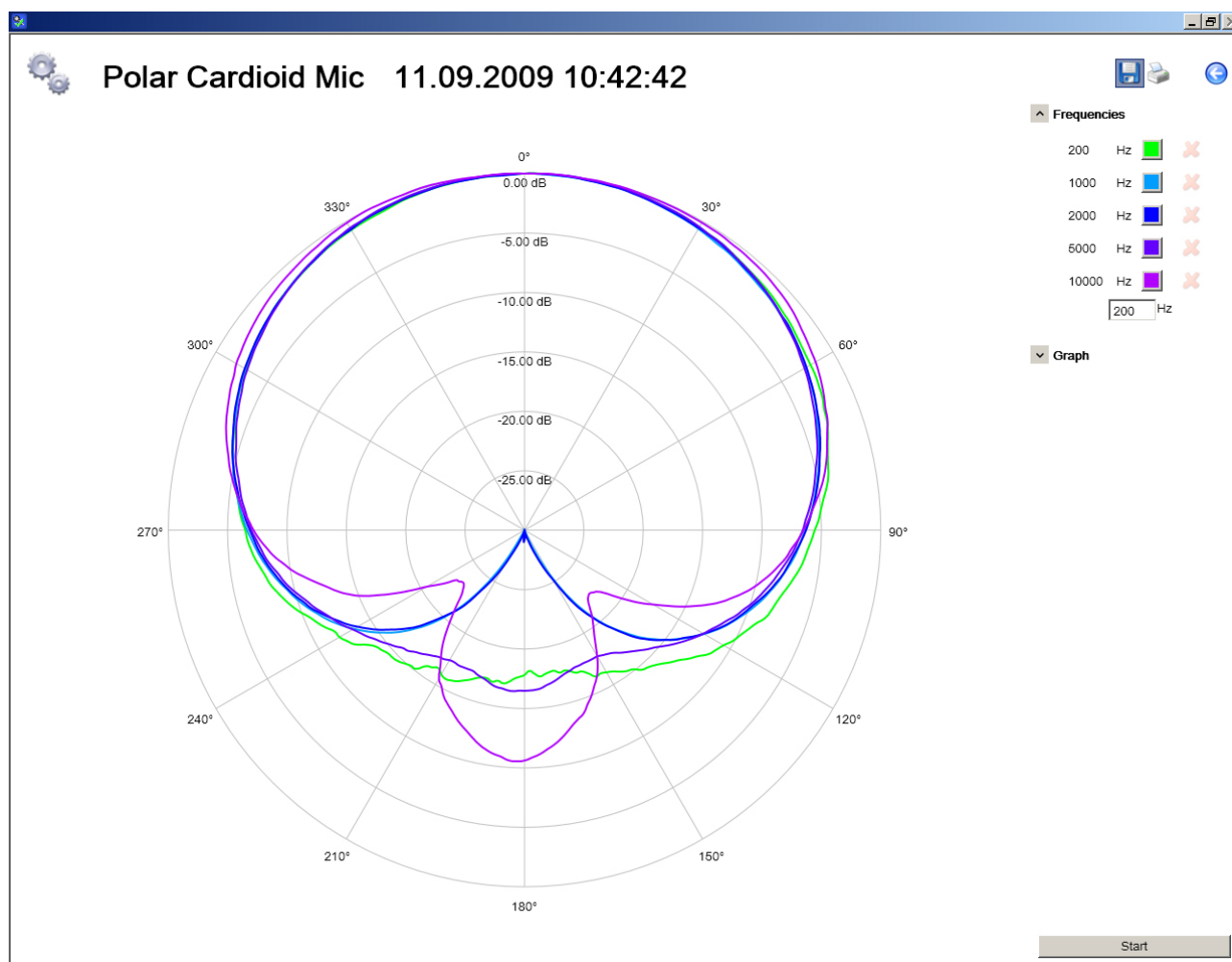


Screenshot: Test parameter and tolerance setting

High-Resolution Polar Plot Measurement

The polar plot analysis with the NTi Audio precision turntable complements the microphone measurement system to an all-in-one solution. The polar diagram displays the directional characteristic related to the measurement frequency of the microphone. For detailed analysis, the measurement angles might be set in arbitrary resolution down to less than 1°.

The high-speed RT-2M audio analyzer generates a series of fast sweep signals, covering the complete audio band from 20 Hz – 20 kHz, and turns the microphone to the configured angles between the sweeps. The measurement time halves by choosing the 180° mode, which mirrors the polar image. The polar plot graphics can be adjusted after the completed measurement, thus the microphone test system offers full flexibility for post processing.

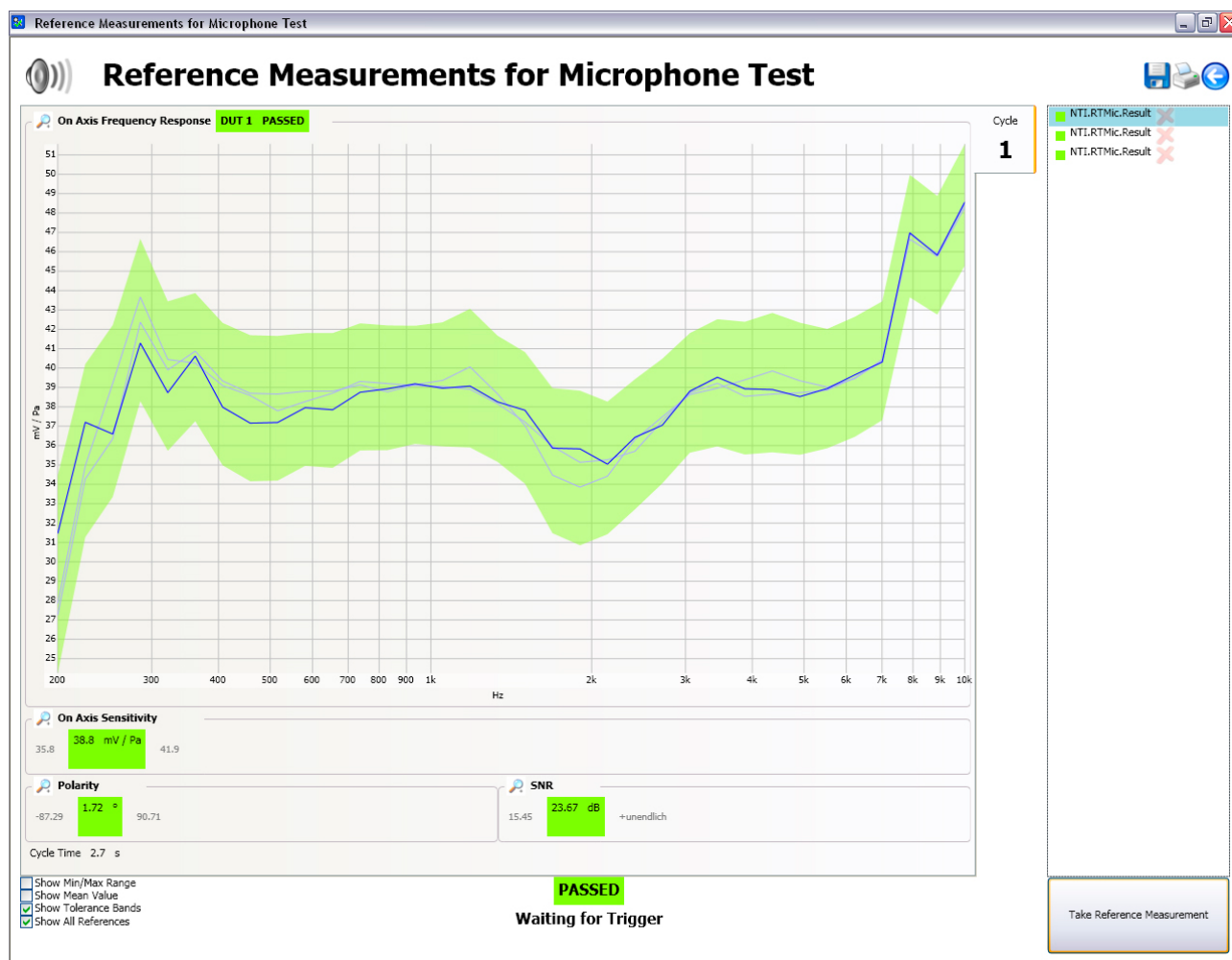


Polar plot measured of cardioid microphone

Calibration and Recording of Reference Data

The automated calibration (e.g. equalization of the reference speaker) is carried out with the measurement microphone M2010. Thereafter the smart "learn-mode" simplifies tolerance definition by feeding the system with a representative set of one or more "Golden Samples". The flexible tolerance management automatically derives its tolerance Pass/Fail criteria. The system also supports up to five different quality clusters, which may be user-defined, such as "Excellent", "OK", "Acceptable", "Class 3" and "Reject". This allows the manufacturer to distinguish between quality classes.

System integration into existing production lines and the connection to host controllers is very simple. The extremely short test cycle time enables the microphone test system to easily cope with high volume production lines.



Screenshot: Recording of reference data

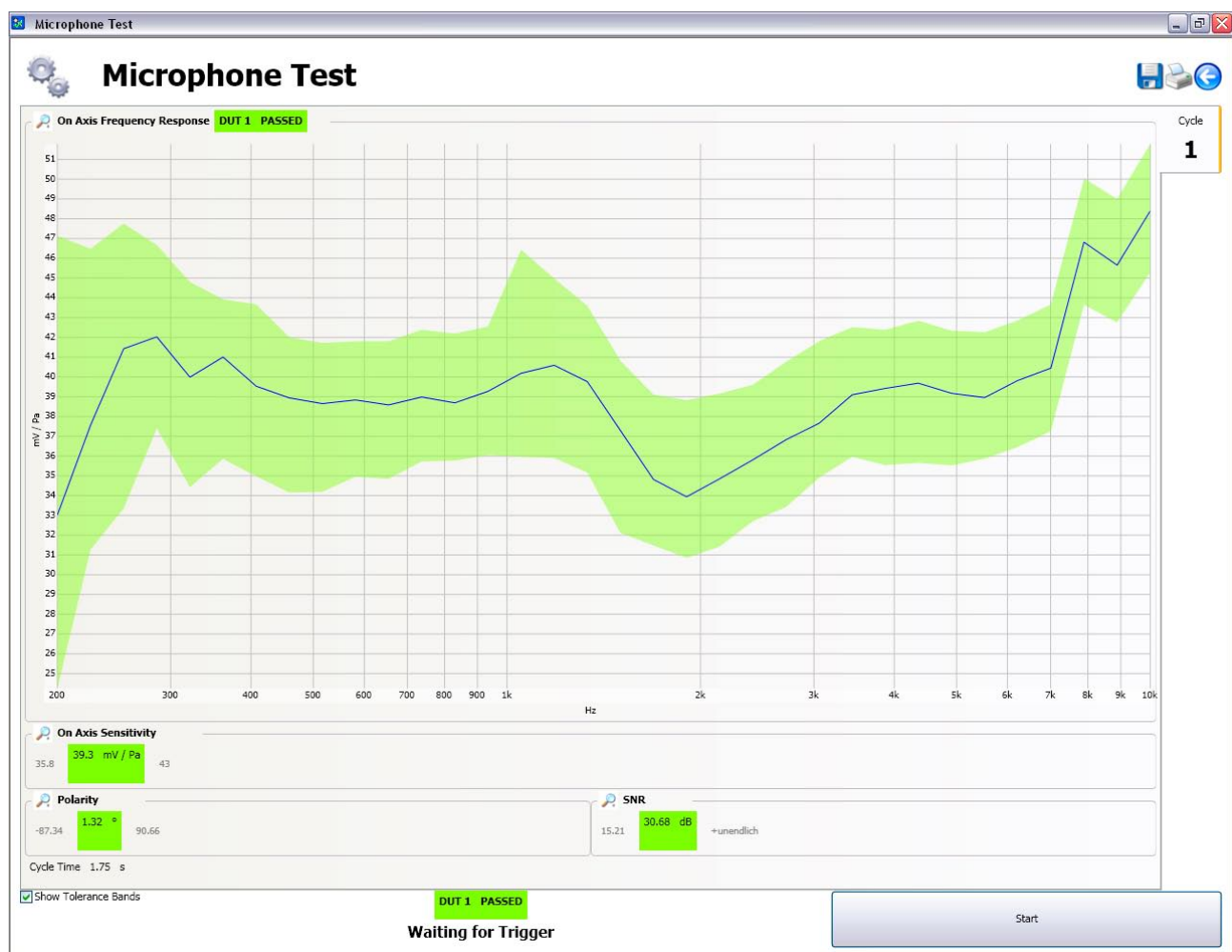
Microphone Test Production Mode

The patented measurement algorithms have been optimized for factory noise immunity. This maximizes production line yield and allows conducting the same measurement in R&D as well as in the production floor. In the production mode the measurement results are compared with the defined tolerances. The individual results of each measured parameter are summarized into a class result. (e.g. Passed/Failed).

The measurement may be triggered by

- Operator, using the keyboard
- Serial number barcode reader
- DIO Input (e.g. PLC trigger signal or foot switch)

The measurement results are shown on the PC-screen, indicated at the digital I/O Output (e.g. driving red/green lamps or bin-sorter) and directly logged into Microsoft Excel xlsx-format.



Screenshot: Production testing result overview

Ordering Information

Basic Configuration:

- RT-2M Audio Analyzer
- RT-Microphone Measurement Software
- PureSound Amplifier 150W
- Reference Measurement Microphone M2010, class 1 frequency response, 1/2", SPLmax = 145 dB SPL
- Reference Speaker

Accessories:

- Precision Turntable with microphone holder
- PureSound Rub & Buzz for testing audibe manufacturing imperfections
- 1/2 Cycle PDM Interface for Digital MEMS Microphones
- Input Switcher IS-1002
- Output Switcher OS-0210

- Environmental Sensor
- Sound Calibrator 1/2" class 1, 114dB, 1000 Hz

Automation Accessories:

- GPIB Card, with Cable
- Digital I/O Card, 6503, 6528,
- Digital I/O 6501, USB
- Barcode Reader

Specifications

Generator

Logarithmic Sine Sweep:

- Frequency Resolution 1 – 500 steps
- Frequency Range 20 Hz – 20 kHz
- Level Range -63 dBV to +26 dBV in 0.1 dB steps
- Level Accuracy < ±0.1 dB @ 1 kHz

Rub & Buzz, Gliding Sweep:

- Frequency Range 5 Hz – 6 kHz
- Level Range -63 dBV to +26 dBV in 0.1 dB steps
- Level Accuracy < ±0.1 dB @ 1 kHz

Analyzer

Frequency Response:

- Frequency Range 20 Hz – 20 kHz
- Test Cycle Time typ. 1 sec.
- Level Range -80 dBVp to +40 dBV (0.07 mV to 70.7 V)
- Level Accuracy < ±0.1 dB @ 1 kHz
- Residual Distortion < -86 dB @ level > -20 dBV
- Residual Noise < -100 dBV
- Polarity Accuracy ±1 degree

Mic Phantom Power Supply

- 15 VDC, 48 VDC pre-installed
- Optional: ICP, 2 V, 5 V

General

- Dimensions 1 rack unit high 483 x 318 x 44 mm (19" x 12.5" x 1.75")
- Weight 7 kg (15 lbs.)
- Control Interfaces GPIB (IEEE-488.2), RS232
- Mains Power 100 - 230VAC / 50 - 60 Hz
- Calibration interval 1 year recommended

Measurement Microphone

- Type: 1/2" omni-directional condenser microphone, flatness better Class 1 according IEC61672-1

All information subject to change without notice. RT-2M, RT-Microphone and M2010 are Trademarks of NTi Audio AG.

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